REMARKS

Review and reconsideration on the merits are requested.

If this application is not in condition for allowance, a telephone interview prior to further action is requested.

Applicants appreciate the Examiner indicating that claims 4, 8 and 10 are allowed, that the drawings have been accepted and that certified copies of the priority documents have been received.

The Examiner is requested, however, to check the basis for rejection of the claims.

In the last Action, claims 3, 7 and 11 were rejected as obvious over Nolte or as obvious over Helmer-Metzmann.

Independent claim 1 was amended to include the subject matter of claims 2/3. Claim 3 was not rejected as anticipated.

Independent claim 5 was amended by including claims 6/7 into claim 5. Claim 7 was not rejected as anticipated.

Independent claim 9 was amended by including claims 10/11 into claim 9. Claim 11 was not rejected as anticipated.

Accordingly, especially considering the Examiner's withdrawal of the anticipation rejections at the bottom of page 1/8 of the present Action, it is believed that the Examiner only needs to reject claims 1, 5 and 9 as obvious over Nolte or as obvious over Helmer-Metzmann. Applicants proceed on this assumption.

The Examiner's position is set forth in the Action, and Applicants will not repeat the Action except as necessary to an understanding of Applicants' traversal which is now presented.

Traversal

The rejection of claim 1 is mooted by canceling claim 1.

Claims 5 and 9 are amended by including the limitation that the sulfonated polyarylene is a sulfonated arylene copolymer obtained by introducing a sulfonic group into a side chain of a copolymer comprising 30-95 mol% the first aromatic monomer unit represented by formula (1) as set forth in the claims, and 70-5 mol% of the second aromatic monomer unit having formula (2) as set forth in the claims. This is the essential limit of allowed claims 4, 8 and 12. Support occurs at page 5, line 26 to page 6, line 10 in the specification.

Claim 5 and Claim 9

The Examiner is requested to review claim 5 as currently amended. As the Examiner will see, one major distinguishing feature of the claimed invention lies in the fact that the sulfonated polyarylene, which is a sulfonated arylene copolymer obtained by introducing a sulfonic group into a side chain of a copolymer, comprises certain specifically defined first and second aromatic monomer units.

Similar remarks apply with respect to claim 9.

Against the above background, Applicants turn their attention to the Action.

At page 2/8 of the Action, Paragraph 7, the beginning, the Examiner states with respect to claim 1:

> "Nolte et al. teach a polymer electrolyte membrane of sulfonated poly(arylene ether sulfones) with various sulfonation levels. Figure 2 shows structure of the polymer membrane having aromatic functional groups."

Nolte does not, however, teach or suggest a sulfonated polyarylene as claimed.

Another distinguishing feature of claims 5 and 9 lies in the fact that the ion-conducting, aromatic polymer membrane has a maximum water absorption in the range of 80-300 weight% based on its dry weight before the hot-water treatment.

In more detail on this point, the initial water content is the maximum water absorption that the sulfonated polyarylene membrane can have before the hot-water treatment, expressed as weight% based on the dry weight (100 weight%) of the sulfonated polyarylene membrane. Thus, it is mandatory that the initial water content of the sulfonated polyarylene membrane of the present invention be 80-300 weight%. See page 11, lines 12-13 and lines 20-24 of the specification.

Since the sulfonated polyarylene membrane of the present invention has ion conductivity which is largely dependent on humidity, in order to obtain stable output at the initial stages of operation and during steady state operation, the sulfonated polyarylene membrane used as a polymer electrolyte membrane in accordance with the present invention should have as low a dependency of ion conductivity on humidity as possible. Accordingly, in order to achieve reduced dependency of ion conductivity on humidity, the sulfonated polyarylene membrane of the present invention is necessarily subjected to a hot-water treatment. See the specification at page 11, lines 13-17 and page 12, lines 6-7.

The hot-water treatment of the sulfonated, ion-conducting, aromatic polymer membrane per the invention is carried out by (1) immersing only the sulfonated, ion-conducting, aromatic

polymer membrane in hot water, or (2) immersing a membrane electrode assembly (MEA) comprising the sulfonated, ion-conducting, aromatic polymer membrane in hot water. In both cases, the temperature of the hot water is in a range of 80-95°C, and the immersing time is 0.5-5 hours. (See page 12, lines 8-14 of the specification.)

Accordingly, Applicants respectfully submit that one skilled in the art referring to Nolte, who does not teach or suggest any sulfonated polyarylene material as claimed, and also does not suggest a hot-water treatment in the range of 80-95°C in combination with an immersing time of 0.5-5 hours as claimed, would not be motivated to reach the invention of claims 5 and 9 as amended and, accordingly, said claims are not obvious over Nolte.

Applicants now address the rejection of claims 1, 5 and 9 as obvious over Helmer-Metzmann, noting claim 1 has been cancelled.

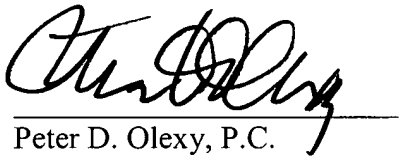
Referring again to the Action, here at Paragraph 8, the material bridging pages 3/8 and 4/8 of the Action, with respect to claim 1, the Examiner states:

> "Helmer-Metzmann et al. teach a polymer electrolyte membrane of polyarylene sulfide having aromatic units. A chlorosulfonated material is suspended in water and the suspension is boiled (a hot water treatment), so that the polyarylene sulfide-sulfonic acid chloride is converted into the polyarylene sulfide-sulfonic acid. See Column 1, lines 9-61; Column 2, Lines 6-25, 64-67."

In a manner similar to Nolte, Helmer-Metzmann does not teach or suggest a sulfonated polyarylene as claimed nor does Helmer-Metzmann teach a hot-water treatment in the range of 80-95°C where the immersing time is 0.5-5 hours as claimed.

Applicants thus respectfully submit that there is nothing of record which would support an obviousness rejection over Nolte or Helmer-Metzmann, and request withdrawal.

Respectfully submitted,



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